

the greatest possible number of contemporary individuals of full strength. Contact with the world wastes away individuals with here an accident to-day, there an accident to-morrow. The possession of immortality by the individual, while a doubtful boon to it, would be a harmful luxury to the species. Death makes room for new, complete individuals. Death is, however, by no means a universal attribute of organisms. In unicellular organisms the single cell is at once somatic and reproductive, and, while liable to accidental destruction, is potentially immortal. The Protozoon divides without a remainder; and the life of each Protozoon alive to-day has descended in direct continuity from the life of the primordial Protozoon.

In the Metazoa a division of labour has separated reproductive cells from somatic, and their complexity, by admitting of mutilations short of destruction, has rendered them mortal. The reproductive cells had to remain capable of an indefinite number of generations lest extinction of the race occurred; but when the somatic cells became specialized, there at once arose the possibility and the necessity of a limit to the number of generations.

It is clear that the size of an individual is an inherited property. Conditions of nutrition can only negatively determine growth. No superfluity of nutrition could build up the framework of a dwarf into a giant. Natural selection acting on variations has fixed the average size of individuals. It has in fact fixed the space limits of cell reproduction, and could have equally well fixed the limits in time—the duration of life—of individuals. There is a continuity of life from organism to organism through the divisions of the immortal germ-cells. The somatic cells arising from the germ-cell in each generation possess a limited reproductive capacity, and the limits are fixed by natural selection for each species so as to maintain the greatest possible number of contemporary individuals of full vigour.

P. CHALMERS MITCHELL.

NOTES.

THE French Association for the Advancement of Science has had a successful meeting at Oran, in Algeria. M. Laussedat, the President, chose as the subject of his address the civilizing influence of the sciences. This was the second meeting of the Association in Algeria, the first having been held in 1881.

THE nineteenth annual Conference of the National Union of Elementary Teachers was opened at Cheltenham on Monday. The President, Mr. Pope, in his inaugural address, spoke bitterly of the existing system of elementary education, which he denounced as a "failure." On Tuesday, the same tone was adopted by the Rev. E. M. McCarthy, of King Edward's School, Birmingham, who read a paper to show that the system violates two of the fundamental principles of true education. Those principles are: (1) that the course of studies laid down for each stage should be in harmony with, and adapted to, the natural development of the individual child's mind and body; and (2) that all educational processes should develop faculties so as to produce habits of ready and accurate thinking, besides furnishing the mind with knowledge for use and imparting mechanical skill in the use of it.

PROF. KIEPERT, of Berlin, will start immediately on a journey of research in Western Asia Minor. He will be accompanied by Dr. E. Fabricius, the archæologist. The journey will last three months.

ON Easter Monday, 12,374 persons visited the Natural History Museum, South Kensington. The number of visitors on the corresponding day last year was 6570.

THE Report of the Meteorological Council for the year ending March 31, 1887, which has recently been issued, shows

that at that date observations were being taken for the Office on 143 ships, exclusive of the vessels of the Royal Navy, all of which are supplied by the Council with instruments, although the keeping of a special meteorological log is optional. The work in hand by the marine branch is: (1) the completion of the synchronous charts of the North Atlantic; (2) a discussion of the meteorology of the Red Sea; (3) current charts for the Atlantic, Pacific, and Indian Oceans; (4) charts of the Aden cyclone of June 1885. In order to discover the cause of this storm and of its unusual course across the Arabian Sea, synchronous charts of the North Indian Ocean for the month of June are being prepared. In the weather branch, forecasts are drawn three times a day. A comparison of the results of the 8 p.m. forecasts gives 81 as the total percentage of success. Hay harvest forecasts were issued to some selected stations, as in previous years. Storm-warning telegrams are issued to 141 stations; the trans-Atlantic messages appear to have been of no practical value for the purpose of these warnings—rather the contrary, as they have occasionally caused the premature issue of warnings to our coasts when no storms followed. The principal changes in the climatological branch have been the erection of self-recording anemometers at Fleetwood and North Shields, and of an electric anemometer at Valentia Island, but unforeseen difficulties have hitherto prevented this from being brought into operation. The Report contains a table showing the distribution of gales round the coasts of the British Islands during each month for the fifteen years 1871-85.

M. L. CRULS, the Director of the Imperial Observatory at Rio de Janeiro, has made an appeal to all meteorological observers for assistance in the compilation of a "Universal Climatological Dictionary," which is intended to comprise, in a methodical form, the principal meteorological elements from as many stations as possible over the whole globe. The data asked for are the mean monthly and yearly temperatures, together with the monthly maxima and minima, and the dates of the yearly absolute extremes; the relative humidity, amount of cloud, rainfall, number of days of rain, thunderstorms, and frost, and the prevalent wind, in each month; the mean annual height of the barometer, and its mean annual oscillation. The work proposed by M. Cruls would be very useful, as, although information already exists for a great number of stations, it is dispersed in many different publications, and is expressed in different measures, so that comparisons are difficult. Details relating to the meteorological elements of his own country especially are much wanted.

IN the *Annales du Bureau central météorologique* of Paris for 1885, vol. i., M. Renou has discussed the rainfall of Paris for the last 200 years. The observations were begun in 1688 by Lahire. At that time the Observatory was outside Paris, some distance to the south, but it is now in the midst of a district surrounded by high buildings. It is a curious fact that soon after Leverrier assumed the directorship he planted some trees near the rain-gauge, which in time affected its readings; these trees were afterwards cut down by Admiral Mouchez. The rainfall seems to have undergone some changes in this long period. At the time of Lahire there was a marked maximum in July; now there are two less marked maxima in June and September. The number of rainy days amounts on an average to 169. Snow occurs very irregularly, but it is never entirely absent in any winter. The heaviest rainfall in a short period was on the 9th of September, 1865, which yielded over 2 inches on the terrace of the Observatory in 24 hours; the gauge on the ground overflowed.

WHILE studying the laws of dissolution of salts, M. Umoff came to the following correlation, which seems not to have been yet remarked, and which he communicated in a paper in the *Memoirs of the Odessa Society of Naturalists* (vol. xii. 1). For

potassium chloride, bromide, and iodide, as also for natrium iodide, the weights of salt necessary to saturate a given amount of water at 100° C. are proportionate to the cubes of densities of the respective anhydride salts; while for sodium chloride the same law is true with regard to the saturation weights of water at 0°. The saturation-weights of potassium chloride and natrium iodide at 100° being the double of what they are at zero, they belong simultaneously to both groups.

M. LINDELÖF has contributed to the Proceedings of the Scientific Society of Finland (tome xvi.), a paper on the trajectory of a body moving over the earth's surface under the influence of terrestrial rotation. The author considers that the explanation of the movements of atmospheric currents, for instance, as generally given, is far from sufficient, and leads to inexact ideas. The paper is divided into four parts: the first three deal with the equations of the different movements of a body, and with the forms taken by the trajectory; in the fourth part the theory is applied to the calculation of the passage of the atmospheric wave observed after the Krakatō eruption in August 1883.

PROF. W. BRÖGGER lately submitted to the Swedish Geological Society an account of the work done by the Committee appointed for the purpose of obtaining reports on earthquakes occurring in Sweden. It was decided that trustworthy reporters should be appointed in all parts of the country, and that a number of inexpensive seismographs should be purchased. At the same meeting Baron Nordenskiöld exhibited a new silicate of lead from the Harstigs Mine, in Värmland. Among recent papers of special interest published by the Society is one on the meteors observed in Sweden in 1887, by Dr. Svedmark.

At a recent meeting of the Seismological Society of Japan, reported in the *Japan Weekly Mail* of February 4, Prof. Milne read a paper on earthquake sounds. These frequently precede the shock, are often heard during its progress, and sometimes have been heard after the earthquake proper has ceased. Their character is very varied, from a low, barely audible rumbling, to a loud rattling, like a cart on a stony street, or a volley of musketry. They are heard better in some districts than in others; better probably where the earth's structure is hard and solid than where it is loose and soft. After discussing some of the explanations that have been given, Prof. Milne suggested that there is a close connection between these sounds and the smaller vibrations which invariably precede the shock proper. He had counted as many as seven per second of these sinuosities, and we are warranted in assuming the existence of still smaller and quicker vibrations preceding even these. With more delicate seismographs we might be able to catch the very early infinitesimal movements that herald the approach of an earthquake. With thirty or forty vibrations per second we should have an audible note of very low pitch. It was suggested in the subsequent discussion that as seismographs show a tail-end of sinuosities very similar to the initial ones, we should expect to hear sounds succeeding as often as preceding an earthquake.

THE Report of Mr. Cautley, the Acting-Consul at Trieste, on the forests of Austria, just issued by the Foreign Office, says that perhaps Austria has a larger proportion of forest in comparison with its area than has any other country. The woods cover about 3,500,000 acres, of which 80 per cent. is timber forest, and the remainder of young growth. The Government and the large land-owners own 69 per cent. of the total forest area, the parish authorities 20 per cent., the clergy 5½ per cent., and peasants about 1½ per cent. The forests are, in fact, the principal source of wealth to Austria, and, calculating the cubic contents of all the timber, and reckoning each cubic foot at nine-tenths of a penny, the wealth of the whole country in this respect may be

set down at close on £40,000,000 sterling. The yearly increase in the value of the forests is said to be over half a million sterling.

In the *Zoologist* for April, Mr. Postlethwaite, of Hallthwaites, Cumberland, states that, last autumn, while netting for salmon in the Duddon Estuary, fishermen brought to the surface some massive horns of the red deer. One pair, with the skull attached, must have had at least fifteen points; the length of one horn is 40 inches; the distance apart at the top of the horns, 42 inches; the circumference of the burr, 11 inches. In another case, a skull was recovered with only a portion of one antler attached; and of a greater size than in the previous example. The horn is broken just above the third tine, the length from the base being 14 inches; the length of one tine, 13½ inches; and the circumference of the burr, 10½ inches. A scapula was dredged up and brought to shore at the same time. The weight of each of these specimens was great, the first-named being as much as a man could comfortably carry. Similar horns were found some years ago, and in the neighbouring estuary of the Esk at various times many such antlers have been discovered, most of which are preserved at Muncaster Castle. Mr. Postlethwaite adds that the channel of the Duddon is shifting and running close into the sides of an old peat moss, from which it seems not unlikely that the horns have been washed. In an editorial note appended to this interesting communication it is suggested that the animals which possessed these fine horns may have been wanderers from the great forest of Bowland, in Lancashire, where red-deer lingered until the early part of the present century; and that they may have roamed over Martindale Fell, in Westmoreland, "where a few of their descendants are still preserved, a pleasing link of association with the past."

THE whale fishery in the Greenland seas and Davis Straits was very unprofitable in 1887. In an article on the subject in the current number of the *Zoologist*, Mr. Southwell says that whales are by no means exterminated. Capt. Gray saw fourteen of them in Greenland, and Capt. Adams is reported to have seen seventeen in Davis Straits; but, from long persecution, they are now "simply unapproachable."

THE French Consul at Bilbao states in a recent report that the pilchard or sardine fishery on the Atlantic shores of the northern portion of Spain proved in 1887 a most disastrous failure. During the three months of June, July, and August, which are generally the most abundant in the year, nothing was caught but sardines far too large for the boxes commonly used in the trade. The amount taken in 1886 was 1650 tons, and during the corresponding months in 1887, it was only 790 tons. This large falling off is supposed to be due to the fact that the fish do not find the food they require on this coast, formerly one of their favourite habitats. Perhaps in a large measure it is owing to their having been driven away by the reckless system of fishing which has been adopted in the past.

THE Report of the Mason Science College, Birmingham, for the year ending February 23, 1888, has just been issued. The Chairman of the Academic Board testifies that, although the year was not marked by any new or striking developments in the educational policy of the College, or by any special additions to the existing curriculum of the subjects taught, the general progress of the College upon the lines laid down in previous years was eminently satisfactory. Not only was the total number of day students larger than in any previous year, but the increase affected, in varying proportions, nearly all the different departments. The year was also characterized by a marked increase in the number of systematic students. By "systematic" students are meant those who enter the College with the object of preparing for the various University or medical examinations, for technical dip-

lomas, or for the Associateship of the College, or who are studying some definite subject with the view of teaching, or original research, or with regard to its practical application to manufacturing industries.

WE have received the Proceedings of the Royal Physical Society, Edinburgh, for the session 1886-87. Among the contents is an interesting Presidential Address, by Mr. John A. Harvie-Brown, on the faunal importance of the Isle of May, purely from an ornithological point of view.

WE have received the first part of what promises to be an admirable work—"An Illustrated Manual of British Birds," by Mr. Howard Saunders. The book will be completed in about twenty monthly parts. It is being issued by Messrs. Gurney and Jackson.

A TWELFTH edition of the late Dr. David Page's "Introductory Text-book of Geology" (Blackwood) has been issued. It has been edited by Prof. Charles Lapworth, who, in order to bring all the departments up to date, has found it necessary to recast or re-write almost the whole of the work, with the exception of the introductory and concluding chapters.

MR. HALY, Director of the Colombo Museum, has published a first Report on the Collection of Birds in that institution. It fills about eighty pages demy octavo.

THE new number (the third) of the American periodical—the *Technology Quarterly*—opens with a valuable account, by Mr. W. O. Crosby, of the methods of instruction in mineralogy and structural geology in the Massachusetts Institute of Technology. Mr. S. W. Hunt continues his discussion of the precision of measurements; and Mr. F. W. Clark contributes notes on the assaying of lead, silver, and gold.

THE Johns Hopkins University, Baltimore, has received from the Maryland Academy of Sciences a considerable portion of its scientific collection. Among the specimens is the skeleton of a young fin-back whale captured in the lower part of Chesapeake Bay. Stumps of cycads, which were presented to the Academy by Mr. P. T. Tyson, are also greatly valued. They were taken from the Upper Jurassic clays of Maryland.

ACCORDING to a communication by M. A. Pavloff to the Moscow Society of Naturalists, the meteorite which fell in August last at Okhansk, in Perm, is one of the largest yet known. Its weight, before it was broken, was about 1100 lbs. It belongs to the group of stony meteorites. As it contains particles of unoxidized nickel iron, it must be classified with the sporado-siderites. Its spherical mineral aggregates bring it under the heading of chondrites.

THE following extract from a private letter by a British officer, dated Sittang, Upper Chindwin, February 4, 1888, may be of interest to anthropologists:—"We have arrived here after eight days of hill-marching with very many ups and downs—the highest point just over 5000 feet. We are now completely out of Burma—the hills were sparsely inhabited by uncivilized Chins and Nagas—and are now in a small State, a plateau in the mountains at a level of nearly 3000 feet. The ruler and his people are Hindus by conversion or adoption some hundred years or less ago—the only example I know of Hindu proselytes. The Burmans are tattooed from waist to knee with a fine pattern in blue, looking as if dressed in short dark tights. They wear the hair long, rolled on the top of the head, and covered with a bright-coloured silk kerchief, put on somewhat as one sees in pictures of Negro women of the Southern States in America. The Shans, who were our neighbours in the hills near the Ruby Mines, wear very baggy trousers, like the Chinese, of coarse blue cotton stuff, have uncut hair, and for a head-covering a hat, either of straw or a coarser kind of wicker, of

colossal circumference. This hat is as big as an ordinary silk umbrella, but flat except in the middle, which is conical for the reception of the top-knot, and as this might sometimes prove an insecure hold they often wear a fastening under the jaw. They tattoo more extensively than the Burmans, and sometimes stow away jewels under the skin. I have seen lumps which may have been so caused, from their appearance, but I never had the chance of proving their secretion by enucleation. The Nagas, whom we have used in the last few days as carriers, do not tattoo, and wear a skimpy kilt. The hair is uncut and coiled on the front of the head, the lump or coil of hair secured by a band round the base; the band often made of strings of blue beads or a tape of leather, on which two or three rows of small white shells are sewn. A silver or other metal skewer, about ten inches long, is often stuck through the hair, like the arrows worn by some belles of the West—whether only for adornment, or used as a fork or harpoon, I know not. All these savages have the ears pierced. The Naga carries his snuff in a bit of bamboo thicker than an ordinary lead-pencil; and the Burman, who smokes eternally, sticks his cigar in his ear-lobe—and his cigar is about the size of that Mr. Verdant Green was induced to smoke, of such calibre that it would not pass through a Colt's revolver barrel. The Nagas here are not tall, but their calves and thighs would attract attention even at a Highland gathering at Athol or Braemar. Their loads they carry with a neatly made neck-and-shoulder yoke. From the yoke in front is a brow-band, while behind a rope-loop passes under the load."

THE Students' Engineering Society of the University College, Bristol, concluded the winter session, on March 26, with a public disputation on the gas-engine *v.* the steam-engine, and on March 27 gave a *conversazione*. The electrical and engineering exhibits attracted much attention, and a highly appreciated concert was rendered by the students and their friends.

THE additions to the Zoological Society's Gardens during the past week include a Gannet (*Sula bassana*), a Greater Black-backed Gull (*Larus marinus*), British, presented by Mrs. Rickards; a Hawfinch (*Coccothraustes vulgaris*), British, presented by Mr. Chas. Faulkner; a Common Swan (*Cygnus olor*), British, a — Penguin (*Eudyptes pachyrhynchus*, from New Zealand, deposited.

OUR ASTRONOMICAL COLUMN.

THE PERIOD OF ALGOL.—Mr. S. C. Chandler publishes, in Nos. 165, 166, and 167 of *Gould's Astronomical Journal*, a careful and thorough discussion of the period of this interesting variable. Starting with the observations of Goodricke in 1782, he had at his disposal the times of nearly 700 minima as observed by about fifty astronomers, spread over a little more than a century. His first task was to reduce these observations to a common system—an operation the more necessary, since, in the present low state of our knowledge, differences in the processes of reduction are more important in their effect, if they do not completely overshadow personal differences in observation. Mr. Chandler decided, therefore, to abandon the use of the minimum phase as a reference-point, and re-reduced the entire mass of observations on a method the essential principle of which consisted in taking, as the reference-point, the mean between the times of equal brightness on the descending and ascending branches of the light curve. This involved the abandonment of 199 minima, for which sufficient details could not be procured, but left 496 to be employed in the investigation. Unfortunately these are not by any means evenly distributed as to time, and in the earlier part of the present century satisfactory observations are very scarce.

That the period of Algol was itself subject to change was suspected by Wurm and proved by Argelander, but the formulæ deduced by the latter have not represented later observations. Mr. Chandler has succeeded, however, in reducing its apparently highly complicated anomalies to a comparatively simple law.